Supporting U.S. Aquaculture

Aquaculture provides half of the world's seafood, with about 50 million tons grown worldwide in 2006. Further, half the seafood consumed in the United States comes from aquaculture, and yet about 85 percent of that amount is imported.

Broadly defined, aquaculture is the captive rearing of any life stage of an aquatic organism and includes fish farming as well as activities like the hatching and releasing of sport fish by state agencies. The U.S. Department of Agriculture (USDA) defines aquaculture as a private-sector enterprise. The Agricultural Research Service (ARS) conducts research primarily to support production of aquatic animals that are privately owned. In 2009, Americans consumed an average of about 16 pounds of seafood per person, but less than 1.5 pounds of that was from domestic aquaculture.

Research has identified numerous beneficial effects of consuming seafood, including improved cardiovascular health in adults and neurological development in children. This research has suggested that eating the recommended two servings of fish or shellfish each week could dramatically reduce the risk of death from heart disease.

Seafood demand in the United States and worldwide is steadily increasing due to both population growth and increased demand for seafood per person. But fish and shellfish taken from the ocean are already at or above sustainable levels, so any increase in seafood supply will have to come from aquaculture.

The goal of ARS's Aquaculture national research program (#106) is to conduct research to support existing industries and provide impetus for continued development of a thriving domestic aquaculture industry that can provide U.S. consumers with delicious, nutritious, affordable, and safe seafood. Our research considers the basic principles of sustainability and quality. These include raising fish and shellfish in a manner that protects and enhances the environment and enables those along the whole value chain—from hatchery operators, farmers, feed producers, processors, and distributors—to profit and compete while producing seafood that has all the value and quality expected from U.S.-produced food.

With thousands of miles of coastline and abundant freshwater resources, the United States has the potential to be a major producer of seafood. ARS aquaculture scientists are focusing on genetic improvement, feeds and nutrition, animal health, production systems, and environmental impacts. These research initiatives and results are explored in this issue.

Major research initiatives include finding alternatives to fishmeal in aquaculture diets; improving fish and shellfish survival through vaccines, therapeutants, and breeding programs for better disease resistance; and developing production systems to reduce costs and improve profitability.

Currently, most fish feeds include ingredients like fishmeal and fish oil that come from small ocean fish, like menhaden, which are not usually consumed by humans. But demand for fishmeal and oil is high, and the supply is limited. Consequently, ARS scientists in Idaho, Alabama, Arkansas, and Florida, working with collaborators at universities and other research institutions in the United States and around the world, are developing alternative feeds that include plant- and algal-based meals and other products that will reduce the need for fishmeal and fish oil in aquaculture feeds. The ongoing Alternative Feeds Initiative—involving USDA's ARS and National Institute of Food and Agriculture and the National Oceanic and Atmospheric Administration—has focused attention on this area.

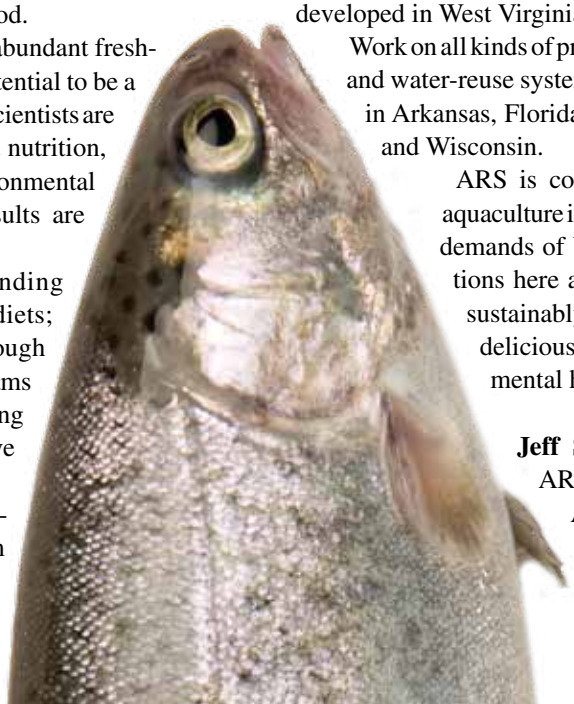
ARS scientists at labs in Alabama, Arkansas, Florida, Maine, Mississippi, Oregon, West Virginia, and Wisconsin are examining fish and shellfish health. The genetics of disease resistance, vaccine development, the host immune system, and pathogen genomes are all being investigated as ways to improve the performance and yield of aquatic systems.

Improving consistency and product quality is another important concern. In particular, treatments to avoid off-flavors in fish are being developed in Louisiana and Mississippi ponds as well as in recirculating aquaculture systems.

Sustaining production without harming the environment is critically important and a priority for the industry. Pond systems with catfish, raceway systems with trout, and net pens with salmon are several traditional production systems. Newer recirculating aquaculture technologies require less water, collect fish wastes, and offer stricter control of water quality—all benefits to the environment and the producer. Recirculating systems generally require higher energy inputs than typical systems, but they have the potential to be located in areas with less abundant water supplies and nearer to markets. ARS scientists have conducted long-term studies on recirculating systems. Tank systems using recirculating aquaculture strategies for freshwater and saltwater fish have been successfully developed in West Virginia and Florida.

Work on all kinds of production systems—ponds, raceways, and water-reuse systems—is being conducted by scientists in Arkansas, Florida, Maine, Mississippi, West Virginia, and Wisconsin.

ARS is committed to providing the tools the aquaculture industry needs to meet the consumption demands of U.S. consumers. Through collaborations here and abroad, these tools will result in sustainably raised seafood that is nutritious and delicious and supports human and environmental health.



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